NATIONAL WEATHER SERVICE, TUCSON, ARIZONA

# COYOTE CRIER

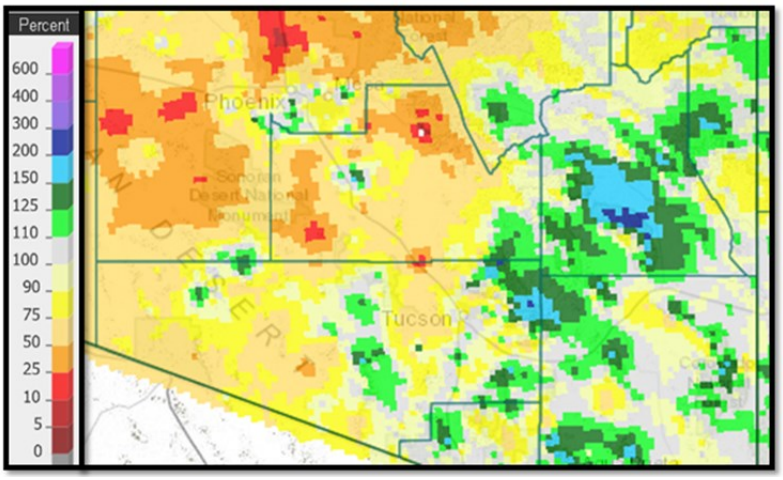
SKYWARN Newsletter Serving the Weather Spotters of Southeast Arizona

VOLUME 21, ISSUE 2 FALL/WINTER 2015-2016

## RAINFALL SUMMARY OF THE 2015 MONSOON

By John Glueck, Senior Forecaster and Climate Focal Point

El Nino conditions during the Monsoon typically tends toward drier than normal. However the correlation is not as strong as it is during the winter. The map below shows the precentage of normal rainfall for the 2015 Monsoon.




| 2015 Monsoon rainfall across southeast Arizona | | | |
|---|---|---|---|
| Portal | 17.00” | Rucker Canyon | 7.87” |
| Coronado National Memorial | 15.68” | Redington | 7.65” |
| Tumacacori National Monument | 15.12” | Green Valley | 7.58” |
| Black River Pumps | 14.65” | Anvil Ranch | 7.57” |
| Sasabe | 13.89” | Duncan | 6.85” |
| Chiricahua National Monument | 13.61” | Patagonia | 6.80” |
| Kitt Peak | 12.84” | Fort Thomas | 6.72” |
| Oracle State Park | 11.20” | Tucson International Airport | 6.63” |
| Bisbee | 11.11” | Safford Agricultural Station | 6.45” |
| Sierra Vista | 10.96” | Vail | 6.38” |
| Cascabel | 10.72” | McNeal | 5.59” |
| San Manuel | 10.48” | Tombstone | 5.42” |
| Arivaca | 10.29” | Willcox | 4.98” |
| Nogales | 9.14” | Picacho Peak | 4.32” |
| Douglas Airport | 8.43” | San Simon | 3.63” |
| Benson | 8.17” | Ajo | 2.29” |
| Pearce-Sunsites | 8.12” | Organ Pipe Cactus Ntnl Monument | 2.17” |

INSIDE THIS ISSUE:

# EL NIÑO AND WINTER 2015-2016??

By Greg Mollere, Senior Forecaster and Spotter Training Coordinator

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An El Niño occurs when unusually warm sea surface temperatures occur in the equatorial Pacific. The region that gets close scrutiny by climatologists/ meteorologists and other researchers is referred to as NIÑO 3.4 and extends $5^0$degs in latitude both north and south of the equator and from 120-$170^0$ W longitude, and can be seen in Fig 1. A network of buoys is in place across this area to monitor temperature, currents and winds in this region of the Pacific. This real-time data is available to researchers and forecasters around the world. The National Oceanic and Atmospheric Administration (NOAA), uses the Oceanic Niño Index, or ONI to measure the strength of the El Niño. The ONI is the three-month running mean of sea surface temperature departures from average in the Niño 3.4 region. When the ONI exceeds +0.5°C for five consecutive overlapping three-month periods, we are considered to be in an El Niño, or warm phase of ENSO. The strength of an El Niño event is determined by how much above zero the ONI is. If the ONI exceeds 0.5°C, it is considered weak, 1.0°C moderate, 1.5° C strong, and 2.0°C very strong. In the 1950-present record, the ONI has only exceeded 2.0°C twice, during the El Niño events of 1982-83 and 1997-98. The ONI is forecasted to exceed 2.0°C with this current El Niño event during the Northern Hemisphere winter of 2015/16.

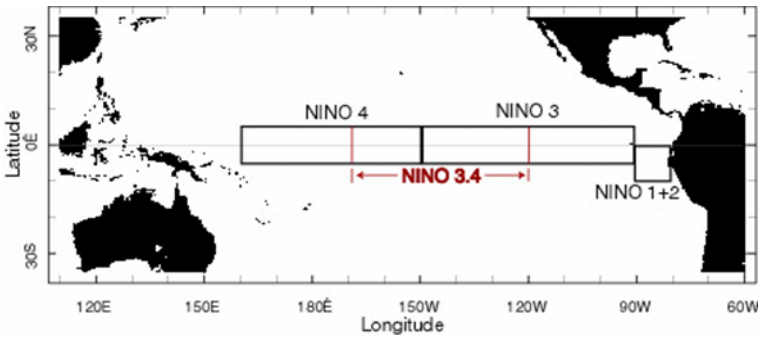


Fig. 1

"THE ONI IS FORECASTED TO EXCEED 2.0°C WITH THIS CURRENT EL NIÑO EVENT DURING THE NORTHERN HEMISPHERE WINTER OF 2015/16"

In Fig. 2, you can see the actual observed temperature average over a 7 day period and centered on Nov. 11, 2015 in the top image. The bottom image is of the observed sea surface temperature anomalies for the same time period. As you can see these temperature anomalies were above $3^0$C, and in a couple of isolated locations above $4^0$C during this time frame for the Niño 3.4 region. Keep in mind that this reading seems high because it is only for a relatively short period of time (one week), whereas the ONI uses a 3 month running mean.

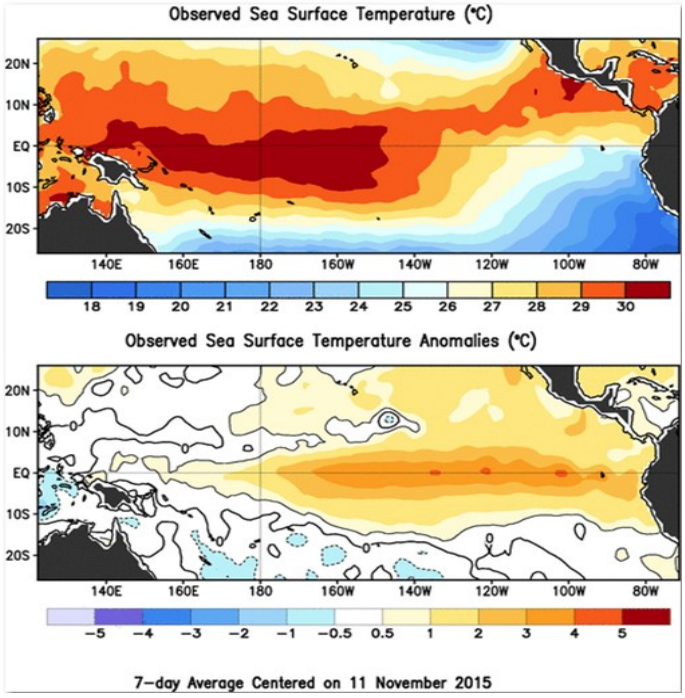


Fig. 2

# EL NIÑO AND WINTER 2015-2016??

So what does this mean for the desert southwest, including southeastern Arizona? Well, the Climate Prediction Center (CPC) in their latest ENSO (El Niño/Southern Oscillation) Diagnostic Discussion indicates that a strong El Niño will continue through the winter and into early Spring, followed by ENSO neutral conditions in the late spring/early summer. The consensus among climate forecasters is that this 2015-2016 El Niño could rank among the top 3 strongest episodes based on the Oceanic Niño Index for the Niño 3.4 region, dating back to 1950.

Therefore, the latest 3 month seasonal outlook issued by the CPC on Thursday November 19, 2015 for December, January & February indicates equal chances of temperatures across southeast Arizona being at, above or below normal during the 3 month period. This can be seen in Fig. 3. As for precipitation, southeast Arizona has a greater than 60% chance of experiencing above normal precipitation. This can be seen in Fig. 4 where much of the southern tier of states from California to Florida and to the mid-Atlantic coast will have a greater chance of seeing above normal rainfall than either normal or below normal during the 3 month period of December, January and February.

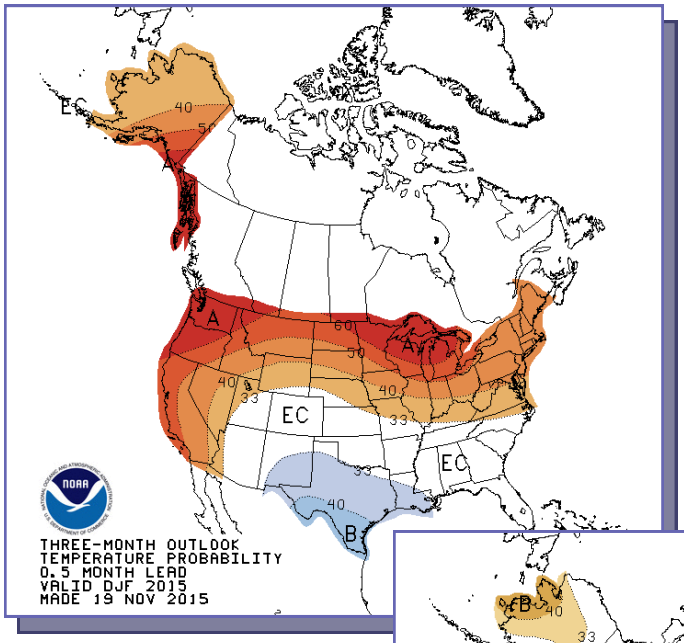


Fig. 3

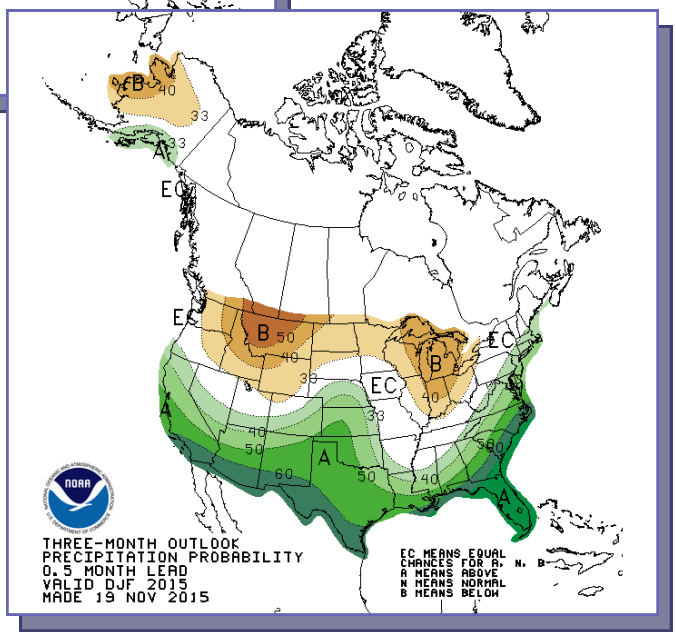


Fig. 4

"THE CONSENSUS AMONG CLIMATE FORECASTERS IS THAT THIS 2015-2016 EL NIÑO COULD RANK AMONG THE TOP 3 STRONGEST EPISODES"

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# IMPACTS OF SEVERE WEATHER DURING MONSOON 2015


By Emily French, Meteorologist Intern and Storm Data Focal Point

With El Nino in full swing, Monsoon 2015 was atypical from a meteorological perspective, with a number of anomalous weather events occurring over the 3 ½ month period (and even some occurring into the month of October). As many of you know, the monsoon is characterized by a change in upper-level wind direction on a regional scale. Here in Arizona, that means the wind will tend to blow from the east or southeast during the monsoon, which aids in pushing tropical moisture into our region. However, the effects of El Nino caused southeast Arizona to sustain a westerly or southwesterly flow for much of the summer, with only intermittent periods of easterly winds. As a result, much of the significant weather was caused by upper level disturbances passing through the state, rather than our typical "daily dose" of afternoon and evening thunderstorms. Additionally, the structure and movement of thunderstorms was slightly different than during a typical monsoon, which caused some very interesting severe weather in many locations. Below, we go into detail on some of the more memorable events.

## Hail

One thing many people, including Tucsonans, saw a lot of this summer was hail. During an average monsoon, Southeast Arizona may experience a hailstorm once or twice, with perhaps a few reports of hail up to 1" in diameter. This year, however, there were several events which produced hailstones much larger than that benchmark. One of these events occurred on June 29-30, when hail up to 1.75" (golf ball size) occurred in Sahuarita, Corona de Tucson and Picture Rocks. Many residents sustained damaged to their uncovered vehicles and/or homes due to the size, quantity, and duration of these hailstorms. In fact, over the two day period, it is estimated that approximately $2.1 million worth of damage occurred from hail alone.

Large hail 6/30/15

Photo courtesy of John Heaphy

Golf ball size hail 6/30/15

Photo courtesy of KGUN

"AS A RESULT, MUCH OF THE SIGNIFICANT WEATHER WAS CAUSED BY UPPER LEVEL DISTURBANCES PASSING THROUGH THE STATE"

Safford Landspout 7/31/15

Photo: Dan Marries via KOLD

## Tornadoes

Although a rare phenomenon for this area, small, weak, short-lived tornadoes can occur in Arizona. In fact, the state averages 4 tornadoes per calendar year. Southeast Arizona contributed its fair share during this monsoon with three confirmed tornadoes. The tornado that was most photographed occurred near Safford on July 31. This tornado, like most that form in Arizona, was a landspout or ascending tornado.

As is a primary mechanism by which landspouts form, we believe that a thunderstorm moving west off of the White Mountains interacted with a dust devil. This rotating column of air was then stretched vertically until it connected with the base of the cloud, forming a landspout. This landspout lasted only a few minutes, and tracked through an open area with no damage or injuries reported. Two additional tornadoes occurred during this monsoon; one in southeast Tucson and a second just north of St. David in Cochise County, on August 29 and Sept 22, respectively.

# IMPACTS OF SEVERE WEATHER DURING MONSOON 2015

By Emily French, Meteorologist Intern and Storm Data Focal Point

## Fatalities

Although deadly lightning and flash flooding can occur any time of the year, we tend to be especially cautious of these occurrences during the monsoon. Unfortunately, we did have two fatalities this year, with one each attributed to lightning and flash flooding. A 32-year old male was struck by lightning and killed in Benson on June 30 while he was walking along the road. Toward the end of the monsoon, a 64-year old female was caught in flash flood waters near Sierra Vista on Sept 19. Sadly, the woman is still considered "missing" with no evidence which points to her exact whereabouts.

## Wind

There were several instances of thunderstorm wind damage which were significant for many people this year. However, here at NWS Tucson, a couple events stand out well in our minds. On July 12, Apple Annie's in Cochise County sustained significant structural and crop damage when a severe thunderstorm rolled through with estimated wind gusts to 70 mph. Employees took shelter in a produce cooler as the storm caused an estimated $40,000 worth of damage. A second event which made the local headlines took place on August 25. Thunderstorm winds estimated at nearly 65 mph blew down 30 power poles along Twin Peaks Road in Marana, several of which trapped 6 vehicles and their 11 occupants for several hours. In addition, about 1300 TEP and Trico Electric Co-op customers were without power for a period of time. Everyone was eventually rescued from their vehicles with no injuries. Damage from this storm was estimated at around $35,000.

Microburst downs Power Poles on Twin Peaks Rd 8/25/15 Photo: Fox 11 News

"THUNDERSTORM WINDS ESTIMATED AT NEARLY 65 MPH BLEW DOWN 30 POWER POLES ALONG TWIN PEAKS ROAD IN MARANA"

## Significant Event Outside of the Monsoon

A rare "Cold Air Funnel" was captured by many people over Tucson on October 7. Cold air funnels can form in showers or thunderstorms when the air aloft is particularly cold, with a vast majority developing during the Spring or Fall months. On this day in October, a vigorous low pressure system was centered over Cochise County, with temperatures in the mid and upper levels ranging from -15°C to -40°C (5°F to -40°F). Most cold air funnels remain just that, although a small percentage can reach the ground and cause EF-0 tornado damage. Atmospheric conditions over Tucson happened to have the perfect ingredients on this day for a well-defined and harmless funnel to develop for a few minutes.

Tucson Cold Air Funnel 10/7/2015
Photo: Cuyler Diggs KGUN

# Incident Meteorologist Re-Certified at NWS Tucson

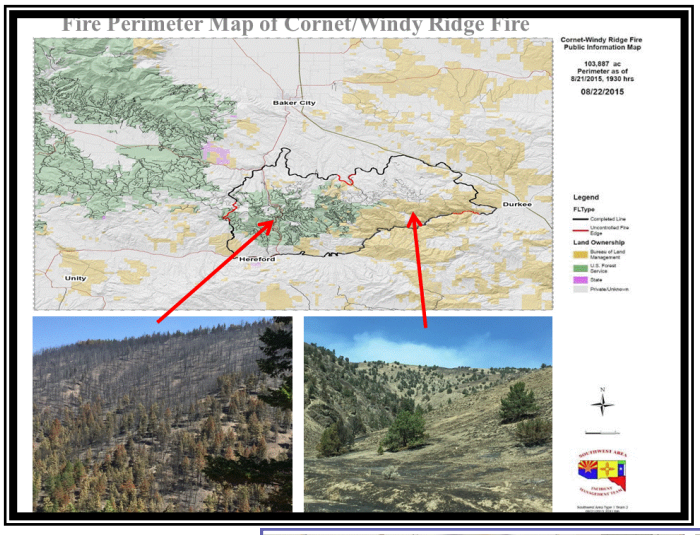
By Gary Zell, General Forecaster and Incident Meteorologist

It had crossed my mind many times over the years. How much I enjoyed being in the field. How much I enjoyed working with the different Incident Management Teams. How much I enjoyed putting my "Meteorological skills on the line" in less than ideal conditions. So after an 11 year hiatus, I decided it was time to go back out and become re-certified as an Incident Meteorologist (IMET).

Even though I was an Incident Meteorologist from 1999 to 2004 and had several large and challenging wildfires under my belt during my time as an IMET (the Bullock and Rodeo fires in Arizona, the Trail Creek fire in Idaho and the Pines fire in California to name a few), I still had to review training modules I had completed years ago, take additional ones (since the training requirements had been expanded) and attend the IMET workshop in Boise. This training took approximately 6 months to complete. After finishing this "in-house" training, I still had to go through at least one assignment in the field as an Incident Meteorologist trainee to become re-certified.

The call for my first assignment in 11 years came on the evening of 8/14/2015. I was being assigned to the Cornet/Windy Ridge Fire in eastern Oregon, near Baker City. Doing a little research before I left, I saw several news articles stating that this fire had closed Interstate 84 between Baker City, Oregon and Ontario, Idaho. Since I was flying into Boise, Idaho I had to make contingency plans for getting to Baker City in case I-84 was still closed. Luckily, the interstate was reopened by the time I reached the Incident Command Post (ICP) at the Baker City High School on August 16th.

My prior IMET experience about fire camp and how the Incident Command Post functions quickly allowed me to catch back up to speed with some of the basics, such as: how the weather forecast is tied into the Fire Behavior forecast and Operational planning for the day, the daily staff, crew and media briefings, as well as much of the required paperwork with check-in, finance, daily logs and the Incident Action Plan (IAP). While some things had not changed, other aspects of camp had changed immensely (namely technological advances). These new changes included a portable laptop workstation which mirrors the same system we use in our office for forecasting, a portable software kit to take upper air soundings on site, infrared mapping and GPS capabilities for determining the fire perimeter and hot spots in real time, as well as greatly enhanced communication abilities including internet and wi-fi connectivity.




"I ENJOYED PUTTING MY METEOROLOGICAL SKILLS ON THE LINE IN LESS THAN IDEAL CONDITIONS"

Top left: Gary Zell giving morning briefing. Top right: briefing area. Bottom left: sleeping area outside of school. Bottom right: Upper-air release.

# Incident Meteorologist Re-Certified at NWS Tucson

By Gary Zell, General Forecaster and Incident Meteorologist

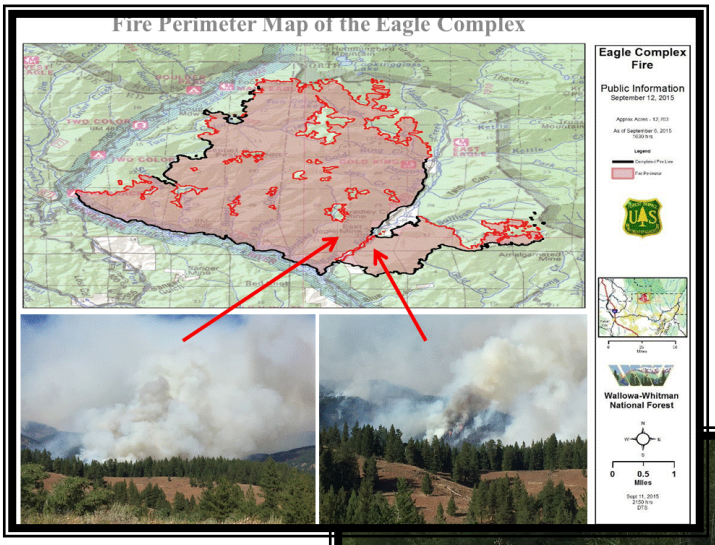
A couple of things made this incident a little less taxing than a normal IMET dispatch. The Incident Command Post was fully established before I arrived. The fire had made it's big run on the 12-14th and was already on the downswing by the time I arrived, with containment numbers going up daily. In addition, because the ICP was housed mostly within the Baker City High School, outside elements were at a minimum, with a workspace in one of the school classrooms and daily briefings held in the cafeteria versus outside in the morning cold and smoke. There were also other "comforts of home" such as; indoor bathrooms and toilets (versus Porta Pottys) and "real" showers in the gym locker rooms.

All of these factors led to the perfect first assignment back in the IMET field, as it allowed me to quickly catch up to speed with the technological advances and any changes within fire camp. Another pleasant surprise with this fire was that I ended up working with the Arizona Type 1 Incident Management Team (who I will be working with on future fire assignments within our region) and knew several members of the team from my previous days as an Incident Meteorologist eleven years ago. I ended up taking over full responsibilities for the IMET position the last three days of this incident, but still within a training role. This included the 0600 morning crew briefing, the 0800 aviation briefing at the Baker City Municipal Airport, an 1100 Upper Air balloon launch, a 1300 Plans briefing, an 1800 Operational briefing and the 2100 Weather Forecast for the next operational period in the IAP. Other duties included; providing weather input to the Fire Behavior Analyst, Operations Section Chief and Fire Information personnel so they could pass any changes onto the field and make adjustments in their projections, as well as input for the daily Situational Report (SIT-209).

I was released from the Cornet/Windy Ridge Fire on August 23rd and traveled a very short one hour northeast to my next fire assignment at the Eagle Complex Fire. Base camp/ICP was set up in a grass field about 4 miles north of Medical Springs, Oregon (population 3) off State Highway 203. Whereas the Cornet/Windy Ridge Fire had some comforts of home (indoor toilets, showers and a climate controlled work area), the Eagle Complex had none of these. Furthermore, there were generator/power issues for several days and no cell phone coverage. At first glance, this may appear problematic. However, after getting back into the swing of things on my first fire this was exactly what I was looking for. I was hoping for a training assignment that got as close to mimicking Initial Attack (IA) conditions as possible, where not everything is set up and working yet, but as an Incident Meteorologist, you still have to provide weather forecasts and data to the management team and crews.

After working four days as an IMET trainee on the Eagle Complex Fire, the Incident Meteorologist I was working with on the fire (in conjunction with the National Fire Weather Operations Coordinator at the *National Interagency Fire Center* (NIFC) in *Boise),* felt I was ready to take over the helm solo. So on 8/27/15 I officially became re-certified as an Incident Meteorologist. I found out later that day that one of my very first duties as "the" Incident Meteorologist would be to brief some senior officials visiting the Incident Command Post for the Operational briefing the next day. These visitors included the Western Region Director of the National Weather Service, the Science and Operations Officer at NIFC and the Meteorologist in Charge at Boise, Idaho. On August 29th I ended my 'tour of duty' at the Eagle Complex Fire and traveled back to Tucson 8/30/15.

So after many months of training and two different fires in a fourteen day period, I am re-certified as an Incident Meteorologist and looking forward to my next dispatch (more than likely in 2016). Our office now has two Incident Meteorologists, Carl Cerniglia and myself, that are available for HAZMAT and county Emergency Operation Centers decision support activities across southeast Arizona, as well as Wildland Fire Dispatch anywhere within the United States.





Incident Meteorologist and General Forecaster, Gary Zell, giving a weather briefing

"I ENDED UP TAKING OVER FULL RESPONSIBILITIES FOR THE IMET POSITION THE LAST THREE DAYS OF THIS INCIDENT"

# OUR OPEN HOUSE WAS A BIG SUCCESS

By Greg Mollere, Senior Forecaster and Spotter Training Coordinator

On October 17th 2015 the National Weather Service in Tucson hosted an open house for anyone interested in seeing our facility, including the "operations area", which is where all the hard work occurs in putting together our daily forecasts and also our severe weather warnings, especially during the monsoon. The open house was also a way for us to celebrate the National Weather Service office being open in Tucson for 75 years. That is correct, since 1940 the Weather Service (referred to as the Weather Bureau in those days) has had a presence in the "Old Pueblo".

There were numerous tours of the operations area conducted between 10 am and 3 pm that particular Saturday in October. In addition, we also launched a special weather balloon release in order for the public to see how these are actually accomplished, which on windy days can be a challenge. Lee Carlaw, Meteorologist Intern, was tasked with performing this crucial launch. With so many folks watching him, the pressure was on for him to "get it right" the first time, and with breezy conditions that day, he came through with flying colors.

To help us celebrate our 75th anniversary, Tucson Mayor Jonathan Rothschild was also present to give us his appreciation for all of the forecasts and weather warnings; past, present and future.

Many folks here at the Tucson office were part of what made this event such a success. This included the tours conducted by General Forecaster Glenn Lader and Senior Forecaster John Glueck, who by the way was working the 10 pm to 7am "graveyard shift" prior to this event, and decided to hang around to help conduct the tours through 3 pm that afternoon. Kudos, John for your sacrifice!

Many thanks and appreciation goes to Senior Forecaster Jim Meyer, who headed up the planning and logistics of making sure all the pieces of the puzzle fit together on the big day. So, thank you Jim!

Also, thanks to all of our SKYWARN spotters that were able to make it to the event.

"SINCE 1940 THE NATIONAL WEATHER SERVICE (REFERRED TO AS THE WEATHER BUREAU IN THOSE DAYS) HAS HAD A PRESENCE IN THE "OLD PUEBLO".

Meteorologist Intern, Lee Carlaw, preparing a weather balloon launch

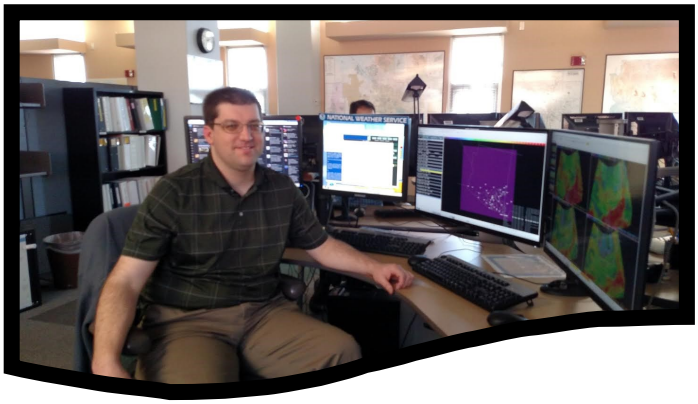
# TWO NEW EMPLOYEES AT NWS TUCSON

## Alan Hickford, Pathways Student Employee

Alan Hickford joined the National Weather Service in Tucson, Arizona as a Pathways student in June 2015 while working on an online GIS Certificate through the University of West Florida. In addition to supporting forecasting operations, he is working on a project using GIS to create a freezing temperature risk assessment for cropland of the region.

Alan graduated from Arizona State University with a Geographical Sciences degree, specializing in meteorology and climatology, where he was a member of the Gamma Theta Upsilon honor society. During his time there, he was a Top 5% Forecaster in the National Collegiate Weather Forecasting Contest. He was a student member of the American Meteorological Society and continues to be a member. Later, he graduated with a M.S. in Atmospheric Science from Creighton University in Omaha, Nebraska, where he focused on climate studies, severe weather, and cloud physics.

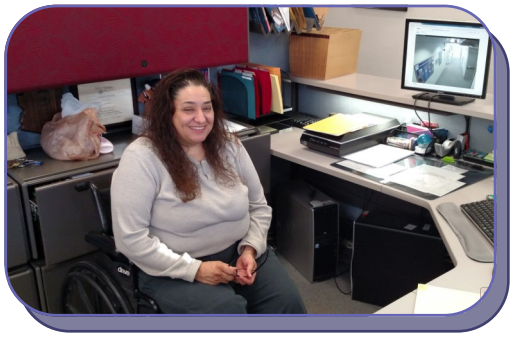
Having grown up primarily in Tucson, Arizona, Alan is excited to start his National Weather Service career in the area he grew up in. When not working, he enjoys hiking and being outdoors, as well as playing video/computer games.



## Leslie Cole, Administrative Support Assistant

I am from Southern Az, born in Tucson and attended school in Patagonia, Sasabe, Tucson and Yuma. My father worked for the U.S. Customs Service so we lived in various border areas, including Rio Rico, AZ and El Paso, Texas. I attended Cholla and Palo Verde High in Tucson, as well as Yuma High. I attended Pima Community College and studied Administration of Justice. Both my mother and father's families are from Tucson, both sides of which resided in the region as far back as when it was under Spain's rule.

I started working at See's Candies on Broadway when I was in high school, and was there for 7 years. I have worked for AZ Dept of Corrections as a Secretary, TSA as a Screener, Pima County Sheriff's Dept as as an Intake Specialist, then as a Public Safety Dispatcher, Texas Instruments as a Drift Test Specialist, and ICE/HSI as a Secretary in Sells.



I love sports of all kinds, especially softball, volleyball and basketball. I played all three through high school. I played ASA Softball here in Tucson.

I am a lifelong UA fan. I enjoy riding horses, four wheeling, going to the range and shooting, doing work around my house, music, reading, watching football and spending time with family. I do not have any children but I do have three nieces and two nephews. I have been with my boyfriend for 18 years, and we have two dogs. I have known my best friend since I was seven years old. I love watching action movies, westerns , comedies and Looney Tunes. I have a tattoo of Bugs Bunny on my ankle. (The original crazy looking Bugs.) I love old Chevys in all forms. I have a 1975 GMC Jimmy we are starting to rebuild. I lost my lower right leg a while back and the Jimmy will be easier for me to drive after I learn to walk again. I hope to learn to scuba dive, travel more and visit colonial Sonora, Mexico, Spain, Italy and Greece where I have roots. I have a new appreciation for life and intend to make the most of it.

-Leslie Cole-

"I LOVE SPORTS OF ALL KINDS, ESPECIALLY SOFTBALL, VOLLEYBALL AND BASKETBALL. I PLAYED ALL THREE SPORTS THROUGH HIGH SCHOOL"

-LESLIE COLE-

Be looking for the Spring Edition of the Coyote Crier sometime during March or Early April 2016. In that edition we will publish the locations, times and dates of the Spotter Training sessions. If it has been a few years since you attended a spotter training class, we recommend that you clear a space on your calendar next spring to attend one of these informative sessions.

Greg Mollere, Senior Forecaster and Spotter Training Coordinator

# *Seasons Greetings*

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*weather.gov/tucson*

## *What You As A Skywarn Spotter Should Report??*

**Tornado:** A Tornado or a funnel cloud

**Heavy Rain:** A Half Inch or more in less than an hour

**Hail:** Quarter size hail (one inch) or larger

**High Wind:** Estimated or measured 45 mph or greater

**Flooding:** Any Kind of Flooding

**Snow:** One inch or more (2 inches if above 5000 feet)

**Visibility:** Less than one mile

**Death/ Injury:** Any weather related reason

**Damage:** Any weather related reason

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